

SYSTEMICALLY IMPORTANT DOMESTIC BANKS: AN INDICATOR-BASED MEASUREMENT APPROACH FOR THE UKRAINIAN BANKING SYSTEM

DOI: 10.18267/j.pep.531

Anna Buriak, Serhiy Lyeonov, Tetiana Vasylieva*

Abstract:

This study offers a scientific and methodical approach to identifying systemically important domestic banks based on the indicator-based measurement approach recommended by the Basel Committee on Banking Supervision. By improving both a set of criteria and indicators of a bank's systemic importance it is offered to distinguish its five levels – low, moderate, medium, significant and high. The approach was tested on 26 Ukrainian banks representing different groups (depending on the size of assets) according to the classification of the National Bank of Ukraine. We have discovered the absence of banks with high systemic importance in the period 2007–2011 – the majority of banks are characterized by their moderate or low level. In our opinion, the best solution for systemic risk regulation would be the introduction of a differentiated regime of supervision over banks depending on their level of systemic importance and risk profile.

Keywords: systemic risk, risk-based bank supervision, systemic importance indicator, size, interconnectedness

JEL Classification: E58, G21, G18

1. Introduction

During the process of financial globalization, namely the creation of transnational financial institutions, the strengthening of international financial relations, qualitative and quantitative changes in the banking business in general, a risk-based bank supervision remains a priority goal in the development of financial regulation systems. At the same time, the increasing level and scope of banking risks and, as a result, the growing vulnerability of the national financial systems require a further adjustment of mechanisms for risk-based banking supervision at the global level. During the G-20 summit, which took place in Canada in June 2010, some new tasks of banking supervision were approved in order to enhance the stability of the financial system, to establish reliable supervision systems by concentrating the supervisors' attention on systemically important financial institutions with consideration of their impact on financial stability, to further improve risk management on the micro-and macroeconomic levels, to increase the transparency of the banking

* Anna Buriak, Ukrainian Academy of Banking of the National Bank of Ukraine, Sumy, Ukraine (a.buriak@mail.ru);
Serhiy Lyeonov, Ukrainian Academy of Banking of the National Bank of Ukraine, Sumy, Ukraine (svl76@mail.ru);
Tetiana Vasylieva, Ukrainian Academy of Banking of the National Bank of Ukraine, Sumy, Ukraine (tavasylieva@ukr.net).

institutions' activities and to deepen the level of harmonization of international supervision standards (IMF Global Financial Stability Report, October 2012; Chen Zhou, 2009).

The systemic risk and its regulation is one of the most important problems in reforming the international standards of banking supervision and regulation. In November 2011, based on the recommendations of the Financial Stability Board, the Basel Committee on Banking Supervision developed a consultative document "Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement" (BCBS, November 2011), and in July 2012 it developed "A Framework for Dealing with Domestic Systemically Important Banks", which became the basis for improving and developing the instruments of banking regulation and supervision by the national supervisory authorities (BCBS, August 2012). Based on the methodology of the Basel Committee on Banking Supervision, in particular, on the indicator-based approach, P. Brämer and H. Gischer adjusted it to identify systemically important banks in the Australian banking system by changing the choice of financial indicators for reflecting systemic relevance because of their disclosing to the regulatory authorities only (Brämer P., Gischer H., December 2011). Besides that research of Skořepa M. and Seidler J. is also one of the examples of conducting indicator-based approach for a specific (the Czech) national banking sector, using a partly different approach (Skořepa, M., Seidler, J., 2013).

In the contemporary economic literature there are several methodological approaches to identifying systemically important banks. In the study of the Deutsche Bank Christian Weistroffer defines the methods for identifying systemically important banks in accordance with such criteria as the subject (supervising authorities and scientific researchers) and the type of the used data (balance sheet and market data) (Weistroffer Ch., August 11, 2011). Mathias Drehmann and Nikola Tarashev differentiate between the methods based on the assessment of banks' participation in systemic risks (participation approach), and the methods based on the assessment of banks' contribution to systemic risks (contribution approach), which differ according to the distribution of the systemic risk among banks (Drehmann, Mathias and Tarashev, Nikola A., March 2011). Following the results of the seminar of the European Central Bank "Recent Advances in Modelling Systemic Risk Using Network Analysis", which was held in October 2009, it should be noted that the network method has a high potential in terms of macro-prudential supervision, including the supervision of the financial market infrastructure (the study of payment systems stability) and somewhat limited possibilities in terms of off-line bank surveillance, taking into consideration the rapidly changing market information and concentration solely on the interbank lending market (ECB, October 5, 2009).

There are three main methods for identifying systemically important banks – indicator-based method (BCBS, November 2011), network method (ECB, October 5, 2009) and the method of systemic risk distribution (Drehmann, Mathias and Tarashev, Nikola A., March 2011). Their comparative characteristics are provided in Table 1. Taking into account such criteria as the availability of the market data, the simplicity of calculations and practical significance of the results of systemic risk assessment it should be noted that in order to identify systemically important Ukrainian banks it is appropriate to use the indicator-based measurement approach.

Table 1 | The Comparative Analysis of Methods for Identifying Systemically Important Banks

Method	Essence	Advantages	Drawbacks
Indicator-based method (BCBS, November 2011)	It makes possible to classify banks according to the level of their systemic importance based on the summation of weighted indicators. These indicators characterize different aspects of a bank's activity in terms of its systemic importance	<ul style="list-style-type: none"> • Ease of use and low need of additional resources • Reliability of the obtained estimates • Multidimensional assessment 	<ul style="list-style-type: none"> • Static evaluation and the presence of time lags • Retrospective analysis focuses on the assessment of the past events • Its relative character does not provide an absolute assessment of systemic risks • The need to justify the priority of some criteria and indicators
Network method (ECB, October 5, 2009)	Formalization and analysis of the relationships between the financial market participants by building a financial network (banks (nodes) and relations between them), characterization of the level of the relationships' complexity, identification of the most systemically important banks	<ul style="list-style-type: none"> • Provision of detailed information regarding the system of relationships on the financial market • Ability to model shock events and different development scenarios 	<ul style="list-style-type: none"> • The need of additional resources and the rapidly changing information regarding the banks' open positions on the financial market • It does not take into account market peculiarities (asymmetry of information) • Absolutization of the role of relationships on the financial market
Method of systemic risk distribution (Drehmann, Mathias and Tarashev, Nikola A., March 2011)	The analysis of securities portfolio of banks (including OTC contracts) and the potential consequences for banks as a result of significant changes in market prices and financial condition of issuers	<ul style="list-style-type: none"> • Prospective analysis focuses on the assessment of the future events • Quick information updating (market data) 	<ul style="list-style-type: none"> • It can be used only if the market data and the data about the activity of banks on the securities market are available • High volatility of data and the complexity of assessment

Source: BCBS, November 2011, ECB, October 5, 2009, Drehmann, Mathias and Tarashev, Nikola A., March 2011

Among the main features of this approach there are the multidimensional evaluation, the availability of the required data and the reliability of results.

Our study has the following objectives:

1. Adaptation of the indicator-based approach proposed by the Basel Committee on Banking Supervision to the supervisory needs of the National Bank of Ukraine as a regulator of the monetary market in Ukraine to identify systemically important banks.
2. Testing of the indicator-based measurement approach adapted to the needs of the National Bank of Ukraine on the basis of official statistical information, and identification of systemically important banks during the period 2008–2012.
3. Giving recommendations on the further use of the results of identification of systemically important Ukrainian banks.

The paper is structured as follows. The next section describes the peculiarities of the institutional structure of the banking system of Ukraine. Section 3 deals with the methodology for

determining systematically important banks in Ukraine on the basis of the indicator-based measurement approach of the Basel Committee on Banking Supervision. Section 4 demonstrates the results of identifying systemically important banks in Ukraine. Section 5 is devoted to the regulation of systemically important banks in Ukraine by introducing a multilevel system of banking supervision. The last section concludes.

2. Ukrainian Banking System

In 2012 there were 175 banks operating in Ukraine, of which 54 were banks with foreign capital. The National Bank of Ukraine identifies four groups of banks depending on the size of their assets: the first group of banks - the biggest banks with assets value exceeding 1.875 billion US dollars, the second group of banks - large banks (with assets exceeding 625 million US dollars), the third group of banks - medium-sized banks (with assets exceeding 375 million US dollars), the fourth group of banks - small banks (with the size of assets less than 375 million US dollars). Traditionally, the banks of the first group are the most active participants of the Ukrainian market of banking services (Table 2). The group of the biggest banks in Ukraine includes some major international banks and financial groups, such as Raiffeisen International Bank-Holding AG, OTP Group, BNP Paribas Group, UniCredit Group and others.

Table 2 | Indicators of the Banking System Structure (groups of banks) as of January 1, 2012 (NBU, 2012)

Group of banks	Number of banks	Measurement unit	Assets	Capital	Deposit portfolio	Credit portfolio
1 group	17	%	66.9	65.5	56.9	70.2
		Billion dollars	88.2	12.7	44.0	71.4
2 group	19	%	14.8	14.9	11.2	14.8
		Billion dollars	19.4	2.9	8.7	15.1
3 group	22	%	7.8	6.3	7.6	6.4
		Billion dollars	10.2	1.2	5.9	6.5
4 group	117	%	10.5	13.3	24.3	8.6
		Billion dollars	13.9	2.6	18.8	8.8
Banking system	175	%	100	100	100	100
		Billion dollars	131.7	19.4	77.4	101.8

Source: Data from National bank of Ukraine, 2012

In the context of the problem of distinguishing the country’s systemically important banks, it should be noted that during the financial crisis of 2008–2009 the Ukrainian banking sector demonstrated its vulnerability and the need for financial assistance from the state and international financial institutions with a necessity of supporting the largest banks in order to prevent the spread of the crisis processes. The most troubled banks in Ukraine were the joint-stock company “Prominvestbank”, the joint-stock company “Nadra Bank”, the limited liability company “Ukrprombank”, “Ukrgazbank” and the joint-stock company “Rodovid Bank”, which belong to the first group of banks. Unlike the causes of problems at international

systemically important financial institutions, the main reason for the occurrence of problems in Ukraine was the lack of liquidity due to the massive outflow of deposits (according to the National Bank of Ukraine, within ten days of October 2008 the total liabilities of banks decreased by 18 billion US dollars) and the crisis of trust in the banking system of Ukraine. In order to prevent the further realization of systemic risk and insure the timely payments, the National Bank of Ukraine adopted anti-crisis measures by implementing the programs of banks' refinancing, including their recapitalization by means of the budgetary resources received under the "stand-by" programme of the International Monetary Fund. On the whole, to recapitalize the troubled banks Ukraine initially spent 9.5 billion hryvnias with subsequent infusion of 25 billion hryvnias. In addition, in the beginning of 2012 nearly 20 banks were in the process of liquidation - mostly medium-size and small banks that could not withstand the wave of the financial crisis in Ukraine. Therefore, there is the need to distinguish systemically important Ukrainian banks, taking into account not only the size of the bank's assets, but other characteristics that determine the role of the bank on the market of banking services both within the country and abroad.

3. Methodology

The methodology for identifying systematically important Ukrainian banks is based on the indicator-based measurement approach recommended by the Basel Committee on Banking Supervision as an instrument for identifying systemically important domestic banks. The methodology for identifying global systemically important banks distinguishes five criteria of banks' systemic importance on a global scale (size, interdependence, uniqueness of services, international activity, business complexity), each of which has the same weight (20%) and is represented by one or more indicators. For each bank every indicator has a relative value, which is calculated as a ratio of its position and the position of all banks. According to the obtained results all banks are ranked according to the degree of systemic importance within four groups with appropriate capital requirements (Group 1–1%, Group 2–1.5%, Group 3–2%, Group 4–2.5%). According to the recommendations of the Basel Committee on adapting the methods for determining globally significant banks to the level of national financial systems it is necessary to follow certain principles. In particular, it means taking into account the national peculiarities of economic development, the potential impact or external effects (externalities) as a result of a bank's failure (market exit), the choice of the national economy as an object for determining the consequences of a bank's failure, *etc.* Our methodology for determining systemically important banks is distinguished, firstly, by a set of criteria of banks' systemic importance, including the additional criterion of "social significance", and secondly, by the indicators that reveal the content of the criterion, and thirdly, the technique for determining the degree of banks' systemic importance.

3.1 Systemic importance categories

3.1.1 Size

The bank size is one of the key factors of its importance in the context of the national economy. Thus, the bigger the volume of the bank's assets and its share in the market of banking services and the financial market of the country, the more pronounced would

be the impact on the national economy if the bank leaves the market. In the context of the banking system of Ukraine it should be noted that the ratio of the banking system's assets to GDP (over the previous five years it was in the range of 65–95%, NBU) differs considerably from a similar European indicator (100–350%, ECB), which is an indication of the banking sector's development in relation to the scale of the national economy. Analysing the level of concentration in the banking system of Ukraine with the help of traditional indicators, we see that it is not high. For the analysed period, the share of the three largest banks in Ukraine does not exceed 28%, which corresponds to non-concentrated type of the market structure (if the share of the three largest banks is less than 45%, it is non-concentrated; within 45–70% – moderately concentrated, with more than 70% – highly concentrated (Bikker and Haaf, 2001). The value of the Herfindahl-Hirschman index does not exceed 0.1. Despite the low level of concentration on the market of banking services in Ukraine, regarding the first criterion of bank's systemic importance (the size), banks, especially in the first group, should be the object of intensive risk-based supervision. This is due to the fact that the assets of 10 biggest banks (banks of the first group) concentrate more than half of the assets of the Ukrainian banking system, which could lead to catastrophic consequences for the national financial system in the event of significant deterioration in their financial condition. According to the statistical data of the National Bank of Ukraine the value of a bank's assets (does not include off-balance sheet in view of untypically for Ukrainian banks concentrated on traditional banking to push assets off) will serve as an indicator of the “bank size” criterion.

3.1.2 Interconnectedness

According to the international experience, besides the scope of the banking business, the relationship between banks traditionally seen through the mechanism of interbank lending, plays a significant role in terms of banks' systemic importance. The key feature of the market of interbank lending is a high risk to business reputation of agency banks as interbank lending operations are usually unsecured and based on the assessment of the borrower's creditworthiness, its market position and duration of the agency relations. High dependence of banks on the interbank market resources may adversely affect their financial situation in the case of unfavourable conditions on the financial market. To characterize the bank's position on the interbank lending market it is advisable to use the analysis of the volumes of funds from the interbank market and of the funds' distribution on this market. According to the methodology for identifying systemically important domestic banks recommended by the Basel Committee on Banking Supervision, the indicator of interconnectedness of banks on the market is the amount of the granted and received interbank loans, which, in our opinion, needs to be expanded. This is due to the fact that the relationships on the interbank market are not limited to the provision of interbank loans, but also include the keeping of funds in correspondent accounts of other banks, which leads to the formation of the corresponding account balances. In case of deterioration of the agency bank financial condition some problems might occur, which are related to the possibility of withdrawal of such funds. Therefore, it would be more appropriate to use the indicator of funds borrowed by banks and funds transferred into accounts at other banks as an indicator of interconnectedness of banks on the interbank lending market.

Another indicator of the bank's dependence on the external sources is the share of other banks in the structure of its liabilities. A higher share is the evidence of significant

dependence of the bank on the financial market resources and of the increased risk due to the operational nature of its reaction to changes in the economic environment and high volatility.

3.1.3 Complexity

Another criterion of systemic importance of banks is the complexity of the banking business. As its indicators we propose to use the size of the trading portfolio of bank's securities, the portfolio for sale and bank's investments into its non-bank subsidiaries. Taking into account the fact that the trading portfolio contains the securities purchased mainly for the purpose of generating a profit from short-term fluctuations in their prices, and therefore has a short-term speculative character, the indicator of the size of the trading portfolio of bank's securities serves as an indicator of the degree of vulnerability of its financial situation as a result of changes in the conditions of the securities market. Besides according to the BCBS approach holding of financial securities in the trading book could also generate spillovers through mark to market loss and subsequent fire sale of these securities in case an institution experiences severe stress. This in turn can drive down the prices of these securities and force other financial institutions to write-down their holdings of the same securities. The use of a bank's securities portfolio for sale as an indicator of the complexity of the banking business is based on the fact that a bank holds this type of securities portfolio to solve its current problems (such as changes in liquidity needs) and which is characterized by a high volatility of the financial market's trends.

The volume of a bank's investments into its non-bank subsidiaries, which has mainly a long-term character, is a testimony to the degree of the bank's relationships with other economic entities through joint ownership. In this case, it is appropriate to talk about the mutual influence: the worsening of the bank's financial condition could adversely affect the market position of the related economic entities, whereas the negative trends in the activity of the latter could adversely affect the bank's key financial indicators.

3.1.4 Non-substitutability

As a criterion of a bank's systemic importance it is also appropriate to take into account the degree of its uniqueness that manifests itself in the difficulty of replacing the bank by another bank on the market or in the duration of the substitution process, resulting in a deficit of the "unique" banking services on the market. Considering the fact that the uniqueness of the banking business is also determined by the "non-traditional" role that the bank plays on the market or in a specific segment of the financial services market, for example, providing services in the field of interbank payment systems, supervisory authorities should pay close attention to the bank's activities on the market of primary dealers.

The institute of primary dealers in Ukraine was introduced in accordance with the "Concept for Development of the Domestic Market of Government Securities of Ukraine for 2009–2013" by the decree of the Cabinet of Ministers of Ukraine dated April 14, 2008 with № 363 "On Introduction of the Primary Dealers Institute in the Government Securities Market of Ukraine" to increase the liquidity of the domestic market of government securities and to ensure the existence of safe and liquid financial instruments. The role of a bank as a primary dealer provides for:

- on the one hand, getting an exclusive access to the auctions of government securities and the possibility of their further resale to institutional and private investors;
- on the other hand, an obligation to perform the function of a market maker and the need of mandatory prices for the selling or buying of securities on the secondary market, which increases the riskiness of the banking business.

The uniqueness of the banking business, if the bank performs the function of a primary dealer, consists in the fact that based on the results of competition held by the Ministry of Finance of Ukraine, only 16 banks have an access to the primary market of government securities. These banks must fulfill additional requirements concerning the financial position, technological provision, management personnel, increased requirements to the authorized capital of banks (at least 10 million euros), *etc.* In determining the systemic importance of banks we would suggest to take into account the fact of a bank's participation as a primary dealer, which increases the business's riskiness and means a special status of this bank on the market.

The uniqueness of the banking business also includes the specialized nature of banking. In accordance with the national legislation, Clause 1.1 Chapter 8 of the Instruction on the Procedure for Regulating the Activities of Banks in Ukraine provides for the possibility of a specialized savings bank (if more than 50 per cent of the bank's liabilities are the deposits of natural persons) and a specialized trust bank (if the volume of trust management operations exceeds 100 per cent of the bank's total assets), which causes an increased risk concentration of the corresponding banks. As of January 1, 2012, there were no specialized banks in Ukraine (NBU, 2001). However, in determining the systemic importance of banks it is necessary to take into account the amount of money kept on trust management bank accounts. In our opinion, the fiduciary activities (trust operations) are accompanied by increased moral hazards to the public due to the keeping of investors' savings in the banks and increased requirements to managers and their financial conditions. Thus, the disappearance of banks from the market of trust services may adversely affect the level of confidence of economic subjects in the national financial system in general.

3.1.5 Cross-jurisdictional activity

According to the methodology of identifying global systemically important banks the last criterion of systemic importance is the international activity of banks, which leads to additional risks associated with the transfer of crisis impulses from different capital markets. Despite that the BCBS approach to D-SIBs recommends cross-border activity to be subsumed under complexity, we consider it as directly relevant and as country-specific factor taking into account the considerable share of foreign capital in Ukrainian banking system. Thus it's must be the focus of the D-SIB framework. In order to take into account the factor of systemic risks we propose to include the information about the availability of Ukrainian banks' foreign subsidiaries and the presence of foreign capital. From the position of a risk-based monitoring by the National Bank of Ukraine the presence of a foreign capital in banks requires close attention primarily because of an increased risk of its withdrawal from the country in case of deterioration of the socio-economic and political situation in the country or a substantial deterioration of banks' performance. Therefore, banks with foreign capital should be an object of increased banking supervision in terms of the nature and scope of the systemic risk and its implications for the country in general.

3.1.6 Social responsibility

Having reviewed the main criteria of banks' systemic importance recommended by the Basel Committee on Banking Supervision, we propose to use an additional criterion reflecting the social importance of a bank in the country. In our view, the volume of funds borrowed from natural persons, their share in the structure of bank's liabilities and the number of bank's employees should be considered an appropriate indicator of such criterion.

3.2 Data

Looking at the practical aspects of determining the systemic importance of Ukrainian banks there arises the problem of selecting banks for the testing of the scientific and methodological approach given the time required for the gathering of information about 170 banks in Ukraine and informational opacity of the large number of banks. Considering the fact that the criteria of banks' systemic importance include not only the size of their assets, but other characteristics of their activity, we think it appropriate, for purposes of testing the scientific and methodical approach to identifying systemically important Ukrainian banks, to use a stratified sampling of banks with four groups of banks according to the classification of the National Bank of Ukraine. The use of a stratified sample will make it possible to cover banks from different groups. The sample's size will be determined by the stratum of banks (the number of banks in a group according to the classification of the National Bank of Ukraine for one year) and the variability of the studied characteristics (including their standard variation) within the stratum.

We chose the period 2007–2011 in order to study the dynamic changes in the status of systemic importance of individual banks. The annual nature of data is conditioned by the recommendations of the Basel Committee on Banking Supervision regarding the mechanism of identifying systemically important banks.

We assume that the total sample of banks n represents 15% of the total number of operating banks. There are ten numerical characteristics: banks' assets, the amount of banks' borrowed funds, the amount of banks' funds deposited into other banks, the share of banks' borrowed funds in banks' liabilities, trading portfolio of securities, portfolio of securities for sale, investments in subsidiaries, the amount of funds held in trust accounts, the amount of funds deposited by natural persons, the ratio of funds borrowed from natural persons to liabilities.

To determine the sample size n_{ik} from the stratum k (of the corresponding group of the National Bank of Ukraine) we use the Neumann distribution according to the following formula (1) (Cochran, W. G., 1977):

$$n_{ik} = n \times \frac{w_k \times \sigma_{ik}}{\sum_{k=1}^4 w_k \times \sigma_{ik}}, \quad (1)$$

where n is the total number of banks in the sample, which is defined as the total number of operating banks at the beginning of the corresponding year multiplied by the sample size at the level of 15%;

w_k is the weight of the stratum, which is defined as the ratio of the number of banks in the stratum/group k to the total number of operating banks;

σ_{ik} is a standard deviation of the i -the numerical characteristic in stratum k ;
 k is a stratum/group of banks according to the classification of the National Bank of Ukraine.

In order to assess the final sample with all numerical characteristics we will use the equivalence of characteristics, *i.e.* their weight is 1/10. For example, according to the results of calculations in 2011 the sample of banks at the level of 15% of the total number of banks should include 13 banks from Group 1, 4 banks from Group 2, 2 banks from Group 3, and 7 banks from Group 4. For the testing of the scientific and methodical approach we have used a panel data structure, that is, banks as observation units remained unchanged during the entire period.

To identify such indicators as the role of a bank as a primary dealer, the presence of foreign affiliates and the availability of foreign capital, we have used binary characteristics 1 or 0.

3.3 Systemic importance indicator (LBSI)

The formalization of the level of systemic importance of a bank involves the calculation of its integral indicator “LBSI” – “Level of the Bank Systemic Importance”. During the first stage we determine the unit weight of bank i ($i = 1 \div 26$) according to the m -th indicator of systemic importance ($m = 1 \div 14$) in the studied sample and the average unit weight according to the m -th criterion of systemic importance ($m = 1 \div 14$) in the studied sample. During the second stage we use a score system and binary characteristics. If the unit weight according to the n -th criterion of systemic importance is more than average, the bank gets 1 score, if it is less than average in the sample of banks, the bank gets 0 score. The third stage involves the summation of scores of the bank i for all indicators of systemic importance and determination of the level of the bank’s systemic importance by comparing the obtained scores to their maximum number. During the final stage we carry out the qualitative interpretation of the level of the bank’s systemic importance based on the Chaddock’s scale (Chaddock, 1925) for determining the closeness of relationship: 10–30% - low level, 30–50% - moderate level, 50–70% - average level, 70–90% - significant level, 90–100% - high level, making it possible to rank banks according to the degree of their systemic importance.

4. Empirical Findings

According to the results of the testing of the scientific and methodical approach the following data were obtained (Table 3). In the sample of banks with significant level of LBSI there is a domination of banks of the first group according to the classification of the National Bank of Ukraine, although the dynamics of changes of systemic importance of individual banks in the third and fourth groups (Aktiv Bank, ING Bank of Ukraine) is also noteworthy.

For example, while Aktiv Bank was not systemically important in 2007 (7.14%), the level of its systemic importance rose to 21.43% in 2011 due to the bank’s increased activity in the segment of services to natural persons. During the analyzed period, banks with high levels of systemic importance (above 90%) were not observed. At the same time, such banks as Privat Bank, Raiffeisen Bank Aval and Ukrsibbank were characterized by significant levels of systemic importance. On the whole, we can say that Ukraine has a limited number of really systemically important banks. Most banks have a low or moderate level of systemic importance.

Table 3 | The Level of Systemic Importance of Some Ukrainian Banks in 2007–2011 in %*

Bank	Year				
	2007	2008	2009	2010	2011
Privat Bank	71.43	71.43	71.43	64.29	71.43
Raiffeisen Bank Aval	57.14	64.29	78.57	85.71	78.57
Ukrsibbank	64.29	71.43	71.43	71.43	71.43
Ukreksimbank	50.00	42.86	50.00	57.14	50.00
Oshchadbank	42.86	57.14	57.14	57.14	57.14
Ukrsotzbank	42.86	57.14	57.14	50.00	57.14
Prominvestbank	35.71	35.71	71.43	64.29	64.29
Otpbank	35.71	28.57	14.29	28.57	28.57
Nadra Bank	57.14	57.14	50.00	28.57	50.00
Finance and Credit Bank	28.57	28.57	28.57	21.43	28.57
Brokbusiness Bank	28.57	28.57	28.57	21.43	21.43
Fuib Bank	35.71	35.71	21.43	14.29	35.71
Alfa Bank	35.71	42.86	35.71	35.71	35.71
Khreschatyk Bank	7.14	7.14	14.29	14.29	14.29
Imexbank	7.14	7.14	14.29	7.14	7.14
Financial Initiative Bank	14.29	14.29	14.29	7.14	7.14
Ing Bank Ukraine	21.43	21.43	21.43	28.57	35.71
Mega Bank	7.14	14.29	14.29	14.29	14.29
Aktivbank	7.14	7.14	14.29	21.43	21.43
Basisbank	7.14	7.14	7.14	7.14	7.14
Stolichniy Bank	7.14	7.14	7.14	7.14	7.14
Integral Bank	14.29	7.14	7.14	14.29	14.29
Zoloti Vorota Bank	7.14	7.14	7.14	7.14	7.14
Artem Bank	14.29	14.29	14.29	14.29	14.29
Grant Bank	7.14	7.14	7.14	7.14	7.14
Black Sea Bank of Reconstruction and Development	7.14	7.14	7.14	7.14	7.14

Note: *Own calculations based on data from NBU (2012)

It should be noted that the differences between banks in terms of their systemic importance exist not only in the field of the total number of scores, but also in their structural components (Table 4). Banks with a moderate, average and significant level of systemic importance in the relevant category of systemic importance (size, interconnectedness, complexity, non-substitutability, cross-jurisdictional activity, social responsibility) have the highest value, while banks with a low level of systemic importance are significant for the system's stability only within the criteria of social responsibility.

Table 4 | The Level of Systemic Importance of Some Ukrainian Banks in the Context of Systemic Importance Criteria in 2011 in %**

Bank	2011						
	Size	Interconnectedness	Complexity	Non-Substitutability	Cross-jurisdictional activity	Social responsibility	Total
Privat Bank	1	2	2	1	1	3	10
Raiffeisen Bank Aval	1	3	1	0	1	3	9
Ukrsibbank	1	3	2	1	1	2	10
Ukreksimbank	1	3	1	0	0	1	6
Oshchadbank	1	3	1	0	0	3	8
Ukrsotzbank	1	2	1	1	1	2	8
Prominvestbank	1	0	1	0	0	3	5
Otpbank	1	1	1	0	1	0	4
Nadra Bank	1	3	1	0	0	3	8
Finance and Credit Bank	0	1	1	0	0	2	4
Brokbusiness Bank	0	2	1	1	0	0	4
Fuib Bank	0	3	1	0	1	0	5
Alfa Bank	1	3	1	0	1	0	6
Khreschatyk Bank	0	0	0	0	0	1	1
Imexbank	0	0	0	0	0	1	1
Financial Initiative Bank	0	1	1	0	0	0	2
Ing Bank Ukraine	0	1	1	0	1	0	3
Mega Bank	0	0	1	0	0	1	2
Aktivbank	0	0	0	0	1	0	1
Basisbank	0	0	0	0	0	1	1
Stolichniy Bank	0	0	0	0	0	1	1
Integral Bank	0	0	0	0	0	1	1
Zoloti Vorota Bank	0	0	0	0	0	1	1
Artem Bank	0	0	0	1	0	1	2
Grant Bank	0	0	0	0	0	1	1
Black Sea Bank of Reconstruction and Development	0	0	0	0	0	1	1

Note: **Own calculations based on data from NBU (2012)

5. Regulatory Implications

Today the problem of systemic risk regulation in the banking sector is becoming one of the most important in the financial community (Tarullo, Daniel K., June 3, 2011; Elliott, Douglas J. and Robert E. Litan, January 16, 2011; Acharya, Viral V. 2009). An increase of capital requirements is one of the most common instruments regulating systemically important banks. In Ukraine, only Basel-I has been fully implemented with a gradual implementation of the Basel-II standards to be completed by 2020. According to scientific publications on the issues of adaptation of the Ukrainian banking system to Basel-II, we can conclude that the biggest problem is the introduction of the first component – “minimum capital requirements” based on the assessment of credit, market and operational risks. On the one hand, the use of simple approaches, for example, for the calculation of operational risks is very costly for Ukrainian banks – a 15 per cent deduction from the gross net income of a bank within three years is unacceptable in the post-crisis period. On the other hand, the use of more sophisticated methods of risk assessment is restricted by the absence of elements of the market infrastructure (sufficient number of rating agencies) and relevant statistical data for longer periods required for risk assessment. Therefore, it is not appropriate to talk about the introduction of higher capital requirements for systemically important Ukrainian banks. In our opinion, in the context of bank supervision in Ukraine with regard to the systemic importance of individual banks it would be better to introduce a model of differentiated supervision. This model provides for a different intensity of both the distant monitoring and inspections of banks, depending on the level of systemic importance and risk profile of individual banks.

6. Conclusion

The paper studies the problem of systemic risk regulation by identifying systemically important financial institutions such as banks. Considering the recommendations of the Basel Committee on Banking Supervision for identifying systemically important domestic banks we have applied an indicator-based method as an instrument for determining systemically important Ukrainian banks. Our methodology is distinguished, firstly, by a set of criteria for the systemic importance of banks, secondly, by the system of indicators and, thirdly, by the technique for determining systemically important Ukrainian banks. In the context of the examined criteria for systemic importance of Ukrainian banks the criterion of international activity gains extraordinary significance due to the high level of foreign capital in the banking system of Ukraine (about 42%), which leads to additional risks associated with the transfer of crisis impulses from different capital markets. In addition, our approach introduces the criterion of “social responsibility” of banks, which is measured by the volume of funds raised from natural persons and the number of personnel in banks.

The formalization of the level of systemic importance of the bank involves the calculation of its integral indicator “LBSI” – “Level of the Bank Systemic Importance”, the value of which may indicate a low, moderate, average, significant and high level of systemic importance. Ultimately, this makes it possible to rank banks according to the degree of their systemic importance. On the whole, we can say that Ukraine has a limited number of really systemically important banks. Most banks have a low or moderate level of systemic importance – that must be taken into consideration during national banking supervision system updating.

References

- Acharya, V. V.** (2009), "A Theory of Systemic Risk and Design of Prudential Bank Regulation." *Journal of Financial Stability*, Vol. 5, No. 3, pp. 224–255.
- Bikker, J. A., Haaf, K.** (2001), "Measures of Competition and Concentration: A Review of Literature", De Nederlandsche Bank, Amsterdam.
- BCBS** (November 2011), *Consultative document* "Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement."
- BCBS** (August 2012), Consultative document "A Framework for Dealing with Domestic Systemically Important Banks."
- Brämer P., Gischer H.** (December 2011), "Domestic Systemically Important Banks: An Indicator-Based Measurement Approach for the Australian Banking System." Otto-von-Guericke University Magdeburg Working Paper No. 3/12.
- Chaddock, R. E.** (1925), *Principles and Methods of Statistics*. Houghton Mifflin Company, The Riverside Press, Cambridge.
- Chen, Z.** (2009), "Are Banks too Big to Fail?" Research Department of the Netherlands Central Bank Working Papers No. 232.
- Cochran, W. G.** (1977), *Sampling Techniques*. 3rd Ed. New York: John Wiley & Sons.
- Drehmann, M., Tarashev, N. A.** (March 2011), "Systemic Importance: Some Simple Indicators." BIS Quarterly Review.
- ECB** (October 5, 2009), "Recent Advances in Modelling Systemic Risk Using Network Analysis." Paper presented on the workshop in Frankfurt.
- ECB** Statistical Data Warehouse.
- Elliott, D. J., Robert E. L.** (January 16, 2011), "Identifying and Regulating Systemically Important Financial Institutions: The Risks of Under and Over Identification and Regulation." Brookings Policy Brief.
- IMF** (October 2012), *Global Financial Stability Report*. International Monetary Fund.
- NBU** (2001), *Instruction on Regulation of Banks in Ukraine*. National Bank of Ukraine.
- NBU** (2012), *Main Indicators of Ukrainian Banks*. National Bank of Ukraine.
- Skořepa, M., Seidler, J.** (2013), "An Additional Capital Requirement Based on the Domestic Systemic Importance of a Bank." CNB Financial Stability Report 2012–2013, pp. 96–103.
- Tarullo, D. K.** (June 3, 2011), "Regulating Systemically Important Financial Firms." Speech at the Peter G. Peterson Institute for International Economics, Washington, D.C.
- Weistroffer, Ch.** (August 11, 2011), "Identifying Systemically Important Financial Institutions (SIFIs)." Deutsche Bank Research.